

## **RECOMBINANT BACTERIAL SYSTEM WITH ENVIRONMENTALLY LIMITED VIABILITY**

### **Abstract of the Invention**

Disclosed is an Environmentally Limited Viability System (ELVS) for microorganisms based on differences between permissive and non-permissive environments. Viability of the microorganisms are limited to a permissive environment by specifically expressing one or more essential genes only in the permissive environment, and/or expressing one or more lethal genes only in the non-permissive environment. Temporary viability in a non-permissive environment can be achieved by temporarily expressing one or more essential genes in a non-permissive environment, and/or temporarily delaying expression of one or more lethal genes in the non-permissive environment. Environmentally Limited Viability Systems are also disclosed involving coordinate expression of a combination of essential genes and lethal genes. Microorganisms containing an Environmentally Limited Viability System are useful for release into permissive and non-permissive environments. Temperature regulated Environmentally Limited Viability Systems and delayed death Environmentally Limited Viability Systems are particularly suited for delivery of expression products, such as antigens, using recombinant avirulent *Salmonella* by limiting their growth to the warmer environment inside the host, or by allowing growth for only a limited time in the host.